aperture and power most frequently of 212.* For the sake of convenience we may call the dark streaks *belts* and the luminous ones *zones*; and we may divide the disc into three portions—the equatorial, the northern, and the southern region.

The equatorial region may be described as a coloured girdle surrounding the planet, and consisting of two belts with a lighter space included between them. The relative proportion of these belts—the edges of the girdle—seems not invariable, and should be noted. Especial attention should be paid also to the tint of this region, as a diminution of intensity is suspected. The centre of the girdle is one of the most interesting portions of the disc, containing a number of dark markings projecting into it from the S. (upper as inverted) border, but not reaching the opposite N. edge, and taking the form of the piers of a bridge, or, when more fully developed or perfectly seen, of festoons, in which lighter yellow elliptical areas are included. For atmospheric phenomena, as these appear to be, they maintain a singular degree of uniformity and persistency, although their dimensions seem to vary, on different sides of the globe. An examination of earlier drawings, some of them in private hands, which I have been permitted to inspect, shows that, although at present conspicuous chiefly in the equatorial region, they are by no means restricted to that portion of the planet's surface. And here it may be noted that for the due comprehension of these details, especial attention should be paid to the laws of perspective. The *foreshortening*, as it is technically termed, of the regions approximating to the planet's limb, has a great influence on the apparent form of every marking lying in a meridional direction, while the ordinary belts are entirely unaffected by it. In all probability our familiarity from early youth with the common maps of the globe in two hemispheres may tend to preoccupy us with erroneous impressions in this respect, the exterior portions of those hemispheres being projected on an entirely artificial system, which exhibits them as little foreshortened as may be, and consequently extremely unlike their natural appearance on the globe. For any one unacquainted with perspective, it would be worth while to compare the edges of such a map with the corresponding portions of a terrestrial globe, as regarded from one point of view; or a globe being surrounded with a strip of paper bearing a number of equidistant markings, it will be instructive to notice the wide change in their aspect as the globe is made to rotate on its axis. To this foreshortening, it may be noted, rather than to atmospheric obscuration, as has often been alleged, we may ascribe the invisibility of many features of the planet in the neighbourhood of the limb; the existence of an external hazy envelope may be probable, but the fading of the belts at their extremities, which has often been referred to in this light, cannot be considered conclusive; for it is remarkable that as telescopes have been improved, this alleged fading has been less spoken of. It is not at all shown in the finest drawing hitherto published (that by De La Rue), in the use of an instrument of the most critical defining power; and with my nine-inch speculum it is so doubtful under favourable circumstances that I should not have independently noted it. Attention might well be given to this point, as if a difference should be found with the same eye and telescope in different seasons, it would plainly suggest atmospheric variation.

The northern region commences with a very luminous zone, to my eye the brightest and whitest part of the disc, and usually free from interruptions. Next to this comes a belt of remarkable intensity and permanency, from the edges of which dark but short markings have been, though rarely, seen to project. Its colour formed an uniform contrast with the equatorial belts during the last season; but I have thought this less striking recently. This great belt is commonly divided on the north side by a narrow light zone from a small thin companion of uncertain aspect, and during the present season not invariably parallel to its overpowering neighbour; sometimes, it is a mere edging to a streaky cap reaching to the pole, at others, a light stripe intervenes.

Passing now to the other side of the central girdle, we find next to its south border a region of some breadth, less luminous and much less tranquil than the corresponding north zone. It is interrupted by a belt of variable position and aspect, sometimes very feeble and narrow, at others a rival or more to the neighbouring edge of the central girdle. Its origin lies so close to this latter belt that it almost seems to branch out from it, and last season it followed an independent, and, in part, slightly spiral track round the greater part of the globe before its disappearance; at present I have not been able to trace its whole course, but I see that some remarkable changes have taken place. In this zone lay last winter the very curious elliptical marking described by Gledhill and Mayer, but not, I believe, by others. I never saw it, though it must have been repeatedly before my eyes—a valuable caution to myself and other students—for I had supposed myself too familiar with every portion of the disc to have overlooked so singular a feature. It is possible that my failure may have arisen from my having omitted to stop off the extreme margin of my speculum, which lies quite open in its cell without any rim. I had been repeatedly requested to do so by its accomplished maker, but from want of leisure and some difficulty in the arrangement had neglected it till near the close of those observations, when the evident improvement of definition made me regret that I had recourse to the expedient so late. This precaution, which is requisite with all open specula, is in the ordinary mode of mounting rendered needless by enclosure in a cell.

South of this changeable region lies a grey belt of uncertain form and extent, sometimes divided in two, at others partially interrupted by white spots. Between this and the south pole another belt is occasionally seen, and I have thought the colouring of this and the corresponding north area, not identical. The extreme foreshortening of these regions, and the nearly vertical position of the planet's axis, must ever prevent us from obtaining much knowledge of a wide tract surrounding either pole. The north pole is at present the one more exposed, not only to our view but to solar influences; and it may be worthy of notice that there is some existing dissimilarity in the aspect of the two hemispheres. An axial inclination of little more than 3° would indeed cause but little variety of season on the earth; but with the very dissimilar constitution and condition of Jupiter we know not how much may be effected by its influence.

These suggestions need not be carried into further detail. We shall however note, for the benefit of those who are little accustomed to the object, that the optical changes produced by rotation alone are such that we must be on our guard against being misled by their extent and rapidity.

T. W. WEBB

NOTES

WE have received the first Report of the Royal Commission on Scientific Instruction and the Advancement of Science just as we were going to press. We therefore let the Report, which we print elsewhere, speak for itself. We observe that it is signed by all the Commissioners, and we trust that it is the earnest of other, equally if not more important, ones to follow.

WE are informed that the future of the Kew Observatory is now being considered by the Kew Committee. We would ask whether the occasion is not a fitting one to bring before the Royal Commission on the Advancement of Science, which is now sitting, the disgraceful state of this country in the matter of such institutions as Kew. All true and disinterested lovers of science would certainly second anything the Kew Committee might urge as to the importance not only of the retention of the Observatory in its present functions, but also of a considerable expansion of them. We fearlessly express the opinion, that in England the attempt to carry on researches "of long breath" by private effort has signally failed, and the sooner this is acknowledged by scientific men the better. Our remark does not apply only to such researches even, for on all sides, in all branches of knowledge, we are conspicuous from our prominent position in the rear. It is not right that in England we should simply teach what Germans and others have discovered.

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* The results have already been given in detail in the *Popular Science Review*, July 1870.

We greatly regret to have to record the death, at Vienna, of Prof. Haidinger, the eminent mineralogist. Next week we hope to give a sketch of his life.

We have already announced the proposed formation of a Society of Biblical Archæology. The Society has now been organised, and the following papers will shortly be read, or are in progress:—On the relations of the Assyrian and Scriptural Chronology; by Sir Henry Rawlinson, K.C.B., &c. On an Eclipse mentioned on the Assyrian Tablets, hitherto unidentified; by Mr. H. Fox Talbot. On the Medical Science of the Ancient Egyptians; by Dr. S. Birch. On the Invasion of Egypt by adjacent Nations in the time of Menephthah I.; by Dr. S. Birch. On the Ancient Connections of Egypt and Assyria; by Mr. G. Smith. On Ancient Chaldean Inscriptions and their History; by Mr. G. Smith. On the Caverns under Jerusalem; by Mr. W. Simpson. On the Flora of Palestine; by Mr. B. T. Lowne. On the Sarcophagus of Oimenephthah I. (Sethos I.); by Mr. Joseph Bonomi. We give in another column a report of the inaugural meeting held on the 21st inst.

We learn from our Paris correspondent that the leaders of the insurrection have suspended the publication of the *Comptes Rendus*, and have dismissed M. de Parville, the scientific editor of the *Journal Officiel*. Public libraries and scientific institutions are mostly closed, but the museums and galleries have not yet been pillaged. It will be seen, however, from our report in another column that the *Académie des Sciences* continues its sittings with uninterrupted regularity.

We have received a parcel of numbers of the *Révue des Cours Scientifiques*, the publication of which was also maintained during the Siege of Paris, though not with the same regularity as the *Moniteur Scientifique*. The numbers to hand contain many interesting articles on the supply of food, hygiene, surgical science, and other subjects incident to the state of siege.

A Scientific institution has, we learn from *Harper's Weekly*, lately been organised in the city of Washington under the name of the Washington Philosophical Society, the object of which is to furnish to the many persons interested in science, and resident in Washington, the means of convenient communication with each other, in order to exchange discoveries and observations in different branches of learning. Many organisations with the same end in view have been started at various times in Washington, but have not been very successful in accomplishing their purpose, partly on account of the ambition of the founders in endeavouring to give to them too much of a national basis, and partly because the time was not entirely ripe for such an enterprise. It is believed that the prospects of the success of this new society are very good, as Washington possesses, at the present time, a larger number of specialists in the different departments of science than is to be found in any other city in the United States. This is easily accounted for when we bear in mind that the Coast Survey Office, the Patent Office, the Agricultural Department, the United States Medical Department, the Smithsonian Institution, the Library of Congress, the National Observatory, the Scientific Bureaus of the War, Navy, Treasury, and Interior Departments, and other public bodies, all established at Washington, necessarily attract around them men of eminence in the various branches involved in the proper prosecution of their duties. Professor Henry was elected president of the new society, and the usual officers were also chosen.

The library of the Smithsonian Institution at Washington now numbers about 70,000 volumes, including pamphlets. In this collection are comprised complete series of the Transactions of many of the older societies of England and France; and many works which it would be almost impossible to obtain except by the system of exchange which the Society has organised with the scientific publications of societies and individuals throughout the civilised world.

The rapid decrease of food fishes on certain parts of the seacoast and in the lakes of the United States has for a long time been a subject of much solicitude to thoughtful persons: and various causes have been suggested for this state of affairs, and remedies proposed for its correction. Laws have been passed by most of the New England States, and by the British provinces, regulating and protecting the fish and fisheries in the inland waters; but as the jurisdiction of the States does not extend over the high seas, no special effort has been made on their part to protect the marine species by legal enactments. In view of the difficulty referred to, a bill was introduced at the last session of Congress providing for the appointment of a Commissioner of Fish and Fisheries on the part of the United States, to make inquiries as to the alleged facts, and to report upon the same to Congress, together with any suggestions for legislative action in the premises, and the President has just appointed Professor Baird, of the Smithsonian Institution, as the Commissioner in question, with instructions to enter immediately upon the discharge of his duties.

We regret to learn from a letter from Cairo that Dr. Gedge, the medical man and naturalist of the Viceroy's expedition under Sir S. Baker, fell sick some considerable distance above Khartoum. He was sent back, but did not get farther than Khartoum, where he died of acute mania. Mr. Wood, Sir S. Baker's secretary, was also, on account of sickness, obliged to return, and is now under medical care in Cairo. The last news from Sir S. Baker is to the effect that he is still endeavouring to make a passage through a part of the river that is filled up with dead trees and mud for two or three miles. This is situated about 6° N. lat.

Examinations in connection with the Exeter Science Classes will take place at the Albert Memorial Museum on the following dates:—Inorganic Chemistry, May 4th; Animal Physiology, 5th; Machine Construction and Drawing, also Building Construction, 6th; Mathematics, Stage 1, 2, 3, May 8th; Physical Geography, 9th; Acoustics, Light, and Heat, 10th; Navigation and Geology, 11th; Magnetism and Electricity, 12th; Theoretical Mechanics, 16th; Applied Mechanics, 20th; Vegetable Physiology, 18th; Systematic Botany, 12th; Mathematics, Stage 4, 5, May 20th.

At the recent annual meeting of the American Geographical and Statistical Society, Prof. D. C. Gilman, of Yale College, devoted his annual address to a sketch of the last ten years of geographical work in America. He referred especially to the publication by the Maine Historical Society of an elaborate treatise by Dr. J. G. Kohl on the early voyages to America; the topographical work of the United States' Coast Survey; the new geological maps of New Jersey, by Prof. Cook; the work of Humphreys and Abbot on the Mississippi river; the geological surveys of Ohio, Indiana, and Nebraska, by Profs. Haydn and Newberry; the topographical survey by the North-west Boundary Commission, from the Rocky Mountains to the Pacific Ocean; and the explorations of Colorado with its wonderful canons.

A PROSPECTUS is being sent out of a new work on Fungology:—Mycological Illustrations, being Figures and Descriptions of new and rare Hymenomycetous Fungi; edited by Mr. W. W. Saunders, assisted in the text by Mr. A. W. Bennett, and in the drawings by Mr. W. G. Smith. The first number will be published by Mr. Van Voorst on May 1st.

THE *Meteorological Magazine* for February contains a paper on certain Variations of Temperature during the Solar Eclipse of December 22, 1870, by Mr. Townsend M. Hall, the conclusions of which are as follows:—"The total amount of depression at the time of the greatest obscuration was 21°·75, and I would submit that these figures represent more exactly the influence of an eclipse, than if the observations had been taken at any other period of the year. During the summer months both the atmosphere and the earth are so charged with heat, that a partial darkening over of the sun for so short a time loses, to a certain degree, its effect—the diminution of warmth being partially neutralised, before it can reach the earth, by reason of its passage through the intervening atmosphere. It is to be hoped that similar observations will have been made at some point along the line of total obscuration, whilst, on a future occasion, it will remain an interesting question to be determined by meteorologists, how far the thermal depression varies with the season of the year and the climate of the locality."

WE have received a paper on a Wind-direction Rain-Gauge, by Mr. J. R. Napier, F.R.S. The principle of this gauge consists essentially in supporting a vessel, like the first receiver of an ordinary gauge, on a pivot, so that it may be turned with the least wind, and having a spout attached to it, leading the rain into vessels in fixed directions surrounding the receiver, so that if it rains, for example, when the wind is between N.N.W. and N.N.E., the north vessel receives it, or when between N.N.E. and E.N.E., the north-east vessel receives it, &c.; for there are eight vessels which show the amount of rain and direction of the wind at the time.

THE Geologists' Association has paid visits during the past month to the British Museum and the Museum of Practical Geology; and have arranged for excursions on April 10 to Cambridge to visit the Woodwardian Museum and the exposures of cretaceous strata in the neighbourhood of Barnwell, under the guidance of Mr. Wiltshire and Mr. Bonney; to the Zoological and Hunterian collections of the Royal College of Surgeons April 18; and on April 29 to Belvedere and Crayford, led by Prof. Morris, the chief object of interest being the Mammalian remains of the newer Pliocene deposits.

OF late years many discoveries have been made in regard to the habits and characteristics of the aborigines inhabiting the coasts of North America prior to the time of Columbus by careful examination of the artificial heaps of refuse shells, bones, &c., accumulated in the vicinity of their villages. The published researches of Professor Wyman and others have proved full of interest; and as the subject continues to excite the attention of American archæologists, we doubt not that much now hidden will yet be brought to light. As these deposits are usually on or very near the sea, they are much exposed to the wearing of the waves; indeed, their discovery is usually due to exposure of a section by this influence. For this reason it is of importance that the examinations in question should be prosecuted before the heaps have entirely disappeared, as a large proportion will probably not outlive the next half century. We learn from *Harper's New Monthly* that a careful search on the shores of Kent and Northumberland counties, on the eastern coast of New Brunswick, has shown that, in consequence of the wearing away of the soft sandstone shale of the coast for many rods, all traces of the shell deposits, believed to have once existed in abundance, have now entirely vanished.

ACCORDING to a recent report by Dr. Stimpson upon the Crustaceans dredged in the Gulf Stream by Count Pourtales, of the Coast Survey, eighty-one species, of forty-seven genera, were obtained, of which fifty-two of the species and nineteen of the genera are to be considered as new. Only a small proportion of the species were from great depths, fifteen alone being recorded as coming from below 100 fathoms. The greatest depth at which any of the species were found was 150 fathoms, these belonging to the family of the *Portunidæ*. The portion of Dr. Stimpson's report on the brachyurous crabs of this collection has just been published in the Bulletin of the Museum of Comparative Zoology at Cambridge, already so well known for the merit of its zoological memoirs, and the remainder will follow at no distant interval.

DR. KESSLER claims to have discovered lately in Cassel the oldest herbarium known, some of the plants having been prepared in 1556. It contains 614 plants, properly fastened down and labelled, and was formed by Caspar Katzenberger.

A PLAN has been introduced at the Society of Arts, which has found favour so far, for instituting a kind of British Association for Indian topics under the name of the Oriental Congress of Great Britain and Ireland. It will embrace geology, natural history, biology, and other branches of science, and their economical applications. The proposal to hold the first meeting at Manchester met with the approval of the representatives of the Cotton Supply Association.

THE Colaba Observatory at Bombay recorded in three nights only in January 2·28 inches of rain. This is said to be unprecedented there, and generally throughout the Presidency there has been a fall of rain threatening the cotton crops.

UNDER the title of "Comision de la Flora Forestal Espanola," a useful account is published of the trees most suitable for forest cultivation in Spain, with remarks on the importance of keeping up the forests to maintain the equilibrium of the climate.

AT a time when the small-pox is so prevalent, and vaccination has become, so to speak, fashionable, it is surprising that we do not hear something of the many reputed remedies of foreign countries, either as a cure for this disease or as an eradicator of its effects. The *Sarracenia purpurea* is well known for its supposed efficacy, and it was even introduced into this country some few years back. But a plant not so well known in Europe is the *Melia Azadir-achta* L. of India, the leaves of which are used by the natives to cover the bodies of patients recovering from small-pox, as they are supposed to prevent the mark becoming permanent. Dr. Wright says of this tree that "the leaves beaten into a pulp, and externally applied, act like a charm in removing the most intractable form of Psora and other pustular eruptions."

IN a recent article, *Harper's Weekly* referred to the fact that torpedoes were being used for killing fish for manure on the coast of Florida. This business is being carried on about six miles below New Smyrna, at Mosquito Lagoon; and the method adopted is said to consist in exploding the torpedoes in the water, under the schools, as they pass by. In addition to the many that are killed outright and float on the surface, large numbers are wounded, and go off elsewhere to die without being caught. This practice, we are assured, has already resulted in a very marked diminution of the schools of fish in that vicinity, and has been greatly resented by the people of the State, who are endeavouring to drive the operator from its waters.

AN earthquake at Arequipa in Peru, on the 21st December, was strong, and is said to have lasted fifty or sixty seconds. It was attended with much subterranean noise.

AN earthquake shock was felt at Bombay and as far north as Baroda on the night of January 31. It was distinctly noticed over a large area, but did little or no damage.

RECENT telegraphic advices from Havana announce that Captain Selfridge, who is engaged in prosecuting the Darien ship-canal exploration, thinks he has discovered a practicable route over a line where the elevation of the divide is not more than three hundred feet above the level of the sea. The despatch is dated Paya, on the Tuira River, a stream which empties into the Gulf of San Miguel, on the Pacific.

THE well-known Pinang or Betel nuts, the seeds of *Areca catechu*, a handsome palm cultivated in all the warmer parts of Asia, and used by the natives to chew with lime for the purpose of producing a gentle kind of intoxication, form an important article in the interior trade of the Malayan Archipelago, being exported from Sumatra to other islands in large quantities. The exports from Padang alone in one year amounted to 5,057 piculs.

FROM the twenty-sixth Report of the Proceedings of the Calcutta School-Book Society, we learn that during the two years 1868-1869, more than 179,300 rupees was spent in purchases of books for distribution among the natives, the object of the society being "to supply and distribute, at the lowest possible price, a healthy household literature in the vernacular tongues," in which it is assisted by a small monthly grant from Government. The titles of some of the works circulated sound to us peculiar, as "A Treatise on Spiritualism and its Manifestations," "A Drama against Upstarts," "The Grief of Females on the Departure of their Husbands by Rail on Monday," &c.; while the modicum of science given is very small; and, judging from the titles, we should suppose that the instruction in natural and physical science, thought good enough for the natives of Hindostan, is about on a par with that which prevailed in this country in the time of Oliver Goldsmith.

THE Berwickshire Naturalists' Field Club, the oldest society of the kind in Britain, has issued its "Proceedings" for 1870. Besides one or two archæological papers, and an address from the President, the Rev. G. S. Thomson, we have the following contributions to Natural History and Ethnology, chiefly connected with these branches as represented in the district:—"The History of the Wolf in Scotland," "Turnip Insects during 1870," "Botanical Notices," and "Contributions to the Entomology of the Cheviots," chiefly in coleoptera; all these from Mr. James Hardy. The Secretary, Mr. George Tate, contributes a carefully worked-out paper on "The Stature, Bulk, and Colour of the Eyes and Hair of Native Northumbrians;" and Mr. Ralph Carr treats of "The Northumbrians between Tyne and Tweed." There are several other short papers of local interest, and a statement of the rainfall concludes the number.

IN a discussion at the Indian Conferences at the Society of Arts, as to a proposition of Col. Wragge to employ Neilghery peat on railways, it was mentioned that the two largest peat bogs near Ootacamund have been swept away in rains. This was alleged to be through cutting them at the wrong end.

WE learn from Nicaragua that the river and port of San Juan del Norte are shoaling in many places. Where there was deep water in the latter ten years ago, there is now a bank above the surface.

ON THE CONNECTION BETWEEN TERRESTRIAL TEMPERATURE AND SUN-SPOT PHENOMENA

MR. STONE, the newly-appointed Astronomer Royal at the Cape of Good Hope, has recently communicated to the Royal Society an important paper and curve, in which the thermometric observations taken there since 1841 are discussed. This curve he has compared with another constructed on Wolf's observations of sun-spots, and with the following result, which we give in his own words:—

"The agreement between the curves appears to me so close that I cannot but believe that the same cause which leads to an excess of mean annual temperature leads equally to a dissipation of solar spots. There is on the whole a curious appearance of logging of the inverse curve of solar spots over that of temperature. At the maximum about 1856, this, however, does not appear to be the case; but when the uncertainties of the data, both of the solar spots near the minimum, and of the mean temperature also, are taken into account, such discrepancies might perhaps fairly be expected, even if there be a physical connection between the two phenomena as results of some common cause. If there be a sensible inequality in the mean temperature with a period of about ten years, then the mean temperature resulting from the observations in the temporary observatory, which were made near a maximum, will be too high. The corresponding ordinates, therefore, will be depressed too much relatively to those corresponding to observations made in the other two observatories. In the curve 2 I have imperfectly corrected the mean of the results for the temporary observatory on the supposition of such an inequality existing. The only result of such a correction is to modify the curve at the points of junction of the observations made in different positions. The general form is unaltered. It should be mentioned that the point about which the curves appear to differ most is near or at the change of exposure from the original observatory to the temporary shed about 1852.

"I may mention that I had not the slightest expectation, on first laying down the curves, of any sensible agreement resulting, but that I now consider the agreement too close to be a matter of chance. I should, however, rather lean to the opinion that the connection between the variation of mean temperature and the appearance of solar spots is indirect rather than direct, that each results from some general change of solar energy. . . . . The problems of meteorology appear to be presented here in a simpler form than in England, and probably systematic photographic self-registering observations extended over a few years might lead to important results."

EXPERIMENTS ON CERTAIN VIBRATORY PHENOMENA

THE apparatus made use of consists simply of a cardboard disc furnished with radial slits, and which can be rotated with any desired velocity. To examine a coal-gas flame singing in a glass tube, the disc is placed in front of the flame, and the eye placed where the slits pass in a vertical position. When the dish rotates with such a velocity that the interval between two slits passing the eye is just equal to the period of a complete vibration of the flame, the flame appears to be motionless; but if the velocity of the disc be slightly reduced, the flame is seen slowly to go through its changes of form, appearing to consist of a series of puffs, resembling those from the funnel of a luggage locomotive. When the interval between the passing of the slits is equal to, or is one-half, one-third, &c., of the period of vibration of the flame, a singular appearance of a phantom disc is seen, having as many or twice or three times the number of slits really in